

## **MEETING MINUTES (FINAL)**

### **CITY OF TUCSON HABITAT CONSERVATION PLANS**

#### **Technical Advisory Committee (TAC)**

**Wednesday, December 17, 2008, 1:00 – 4:00 p.m.**

**U.S. Fish & Wildlife Service, Tucson Field Office**

**201 North Bonita Ave, Suite 141**

**Tucson, AZ 85745**

#### **ATTENDEES**

##### **City of Tucson (COT) Habitat Conservation Plans (HCPs) Technical Advisory Committee (TAC) members present:**

Dennis Abbate (Arizona Game and Fish Department – Research Branch)

Marit Alanen (U.S. Fish and Wildlife Service)

Rich Glinski (Arizona Game and Fish Department – *retired*)

Trevor Hare (Coalition for Sonoran Desert Protection)

Ries Lindley (City of Tucson – Tucson Water Department)

Guy McPherson (University of Arizona – School of Natural Resources)

E. Linwood Smith (EPG, Inc.)

##### **Other Attendees present:**

Jamie Brown (City of Tucson – Office of Conservation and Sustainable Development)

Locana de Souza (Arizona Game and Fish Department)

Leslie Liberti (City of Tucson – Office of Conservation and Sustainable Development)

Cecil Schwalbe (U.S. Geological Survey)

David Taylor (Tierra Right of Way / Arizona State Land Department)

Nicole Urban-Lopez (City of Tucson – Office of Conservation and Sustainable Development)

Erin Zylstra (University of Arizona)

#### **1. Welcome, introductions, and TAC Guiding Principles**

Leslie said that a TAC member has requested a modification to the committee's mode of operation. Thus, for this and future meetings, all comments from the audience will be reserved for the "Call to the Audience" section of the agendas. Also, audience members may submit written questions and comments to City of Tucson (COT) staff who will forward them to TAC members.

#### **2. Review of 9/17/08, 10/1/08, and 11/19/08 TAC meeting minutes**

Jamie said that he needs additional time to complete the draft October 1, 2008 minutes, prior to TAC review.

Technical Advisory Committee (TAC) members approved the September 17, 2008 minutes with edits from Rich, Marit and additional minor corrections from Bob Schmalzel and Chris McDonald (submitted to Jamie via e-mail).

Technical Advisory Committee (TAC) members approved the November 19, 2008 minutes with edits from Rich.

### **3. Updates:**

#### Recent and upcoming HCP-related meetings

Jamie reported that staff from the City of Tucson (COT), U.S. Fish and Wildlife Service (USFWS), Arizona Game and Fish Department (AGFD), the Town of Marana (Marana), Tucson Audubon Society, Wild at Heart, Phil Rosen, Linwood Smith, and others met in Avra Valley on December 9, 2008 to discuss potential joint mitigation efforts between the COT and Marana for their respective Habitat Conservation Plans (HCPs). The group visited the lands that are under consideration for a joint mitigation program, which include the City-owned Simpson North and South farms, Santa Cruz farm, and the Hurst farm. The purpose of the meeting was to discuss joint mitigation for potential impacts to Tucson shovel-nosed snake (TSS), ground snake, and burrowing owl. Any joint mitigation for TSS would need to occur on lands that have restoration potential, not currently intact TSS habitat.

Jamie said that since the COT needs to preserve intact TSS habitat for mitigation of possible, future COT activities, only land with TSS habitat restoration potential would be considered for joint Marana/COT mitigation. Initially, Jamie said that COT staff hoped that they could partner with Marana by supplying the land for mitigation and having Marana conduct the restoration with some re-vegetation. However, Phil Rosen indicated that more intensive restoration would be needed for the mapped areas to support TSS, such as creating sand dunes/mounds. Jamie said that Phil indicated that successful habitat restoration techniques for TSS are unknown. So, USFWS staff said that it may be possible for Marana to fund a TSS research program on COT lands where TSS are translocated and placed in enclosures to learn how they respond to other species, such as the banded sand snake. This research program may meet Marana's mitigation requirements instead of acre-for-acre restoration.

Rich said that he thinks that allowing research to satisfy mitigation requirements would set a bad precedent. He commented that there is always some level of uncertainty and, with this proposal, instead of getting land restored for land impacted, the COT would be getting research for land impacted and no mitigation on the land. Trevor said that we should get a certain amount of money for every acre of impacted TSS habitat. The money would go into a TSS research program. Linwood said that the TSS is difficult to manage for because we know very little about the species.

Leslie added that the COT would contribute the land – which would be encumbered with a conservation easement – and enter into an Intergovernmental Agreement (IGA) with Marana for management of the land. Marana would construct the sand dunes/mounds and conduct a study on TSS success at those sites. Leslie reported that at the meeting, Phil Rosen said that mounds

similar to the ones that were created on COT-owned lands for the burrowing owls would work well. These areas could serve as dunes for both the snakes and the burrowing owls. She said that Phil thinks that if the burrowing owl density is lower than the TSS density, then predation on TSS by burrowing owls may not pose a significant threat to translocated TSS.

Cecil said that the last time Tucson shovel-nosed snakes were seen in Avra Valley was on Avra Valley Road in 1979. When observed, they were emerging from a small remaining piece of natural vegetation. If there are areas that are still natural, Cecil suggested using them as a model for the restoration sites. Leslie said that that was a good point and that there are several patches of natural habitat to use as a model out on the same property.

Rich asked how much land the COT would contribute per acre of land Marana impacted. Leslie said that the ratios had not been determined yet. Trevor pointed out that the trade-off for Marana is between purchasing land for mitigation in Pinal County, which has been discussed as an option in the past, or doing research on land in Pima County. Leslie said mitigation that would occur in Pinal County would be on land that is existing habitat, versus land that has TSS habitat restoration potential in Pima County. Trevor said that Phil Rosen thinks something north of the Pinal County line is precluding snakes from dispersing further south, adding that Phil thinks it is more than just the presence of agriculture.

#### **4. Discussion:**

##### Desert tortoise habitat model validation

Jamie provided background to the discussion, saying that the TAC decided to use Pima County's desert tortoise (Sonoran population) habitat model for the Greater Southlands HCP, but wanted to validate the on-the-ground accuracy of it before it is applied. The TAC and staff developed a Request for Proposal and sent it to RECON Environmental and SWCA Environmental Consultants, the two consulting companies which were awarded contracts for as-needed environmental work through the COT's Office of Conservation and Sustainable Development. [Given the specific details of the conversation regarding these companies, they are referred to later in the text by a generic label.]. Both companies submitted a proposal. After reviewing the proposals at the November 17<sup>th</sup> TAC meeting, Jamie said that the TAC wanted to speak with the contractors at the December TAC meeting to get additional information. In addition, the TAC developed additional, written questions, which were sent to the contractors after the November TAC meeting.

Jamie reminded the TAC that the COT has a \$25,000 funding constraint under the Segment 3 HCP grant and IGA with AGFD. Jamie asked the contractors if they would be willing to revise their project costs to reflect this constraint, possibly by dividing their proposals into phases. In response, SWCA revised and resubmitted their proposal and RECON submitted a separate, two-page response. These documents were distributed to the TAC electronically prior to today's meeting and were included with the TAC meeting packet. Cecil Schwalbe and Erin Zylstra were in attendance to help the TAC review the proposals.

To avoid any potential, perceived conflict of interest, Trevor recused himself from the discussion because he is an on-call subcontractor under RECON for unrelated work.

Cecil said he reviewed the desert tortoise habitat map generated by Pima County's model and found that many desert tortoise sites that have been reported don't occur on the map. This is not surprising because desert tortoises do not occur often enough in floodplain areas to be captured by the model. Cecil suggested that when the habitat model is evaluated, it should be stratified and put on a grid. Then, various survey areas can be randomly selected and surveyed for occupancy to determine the presence of desert tortoises. Inferences can be made over each stratum from the information gathered through random sampling. He cautioned that they are finding desert tortoises in areas where the model says they do not occur, so he suggested looking for desert tortoises in strata that you may not expect to find them. Cecil said that occupancy models are being used nationwide for establishing the presence of amphibians. He suggested that the TAC review how well the contractor's proposals fit in with the steps he outlined.

Ries asked Erin and Cecil if they felt the proposals were consistent with the process Cecil suggested. Erin said that Company 2 proposed using an occupancy approach, while Company 1 proposed using transects and would only visit each transect once, which doesn't fit within an occupancy approach. This might be problematic because detectability for desert tortoises is low – around 40-45% – and if survey crews only visit each transect once, there is a good chance they won't observe tortoises or sign in an area that is actually desert tortoise habitat. Cecil expressed concerns with the approach Company 1 outlined because it uses an old model and it doesn't include any "safety belts" for detectability. Ries asked if it would still be problematic if they visited twice as many sites. Erin said that the fundamental issue is the number of times a site is visited, not the number of sites visited. Jamie asked if multiple site visits are necessary if they are only looking for sign or habitat features, not an actual tortoise. Erin said trained biologists can detect evidence of habitat or occupancy and this data can be collected in one site visit.

Dennis asked how important recent sign is versus old sign. Erin said carcasses and burrows are not a good indication of occupancy because they can remain for years. Burrows should be validated by sign that indicates recent use. Scat is pretty reliable because it has usually been deposited within a year. Cecil agreed with Erin. He said that he would also insist that the surveys occur during the monsoon season because, after winters of low rainfall, there is hardly any desert tortoise activity. However, since the entire desert tortoise population responds to the summer rain season, this is the best time to survey. Dennis asked Cecil if he would discourage spring surveys. Cecil said you only get enough sign in the spring after good wet winters. Generally, the sample is much smaller in the spring because many males will just wait until the summer rains. Erin agreed. She said a spring survey will only yield a small subset of the tortoise population. It is also difficult to determine the best time to survey in the spring because the rain pattern isn't as consistent as it is during monsoon. Erin said that detectability is consistent from the start of the monsoon rains all the way through mid-October.

Linwood asked if old sign is as good as new sign if they will be using the data for restoration because this would indicate the area has tortoise habitat. Cecil said yes, both old and new sign would validate the model for that purpose.

Leslie mentioned Cecil's suggestion that crews should survey areas that are unlikely to be habitat. She said that it seemed like both proposals emphasized the opposite and only include areas near existing habitat. Company 2 has 20 sample sites, 14 in the modeled habitat and 6 outside the habitat; Company 1 has 70 sample sites, 60 inside the modeled habitat and 10 outside but within 1 km of the modeled habitat. Leslie asked the TAC to clarify whether their focus was to determine if what is modeled is actually habitat or if there are areas that are not modeled that are habitat. The TAC indicated that their goals are to answer both questions. Guy said there is a trade-off between spending more time validating the modeled habitat and looking for new habitat. He said that he thinks that Company 2's proposal with 30% of the sites outside the modeled habitat is reasonable.

Cecil said that there are some isolated areas where desert tortoises are being observed where they weren't protected. However, it may not be as important to the entire population to protect those isolated desert tortoises because they are not breeding populations. Dennis asked how much weight the TAC should give to areas within the HCP planning area for connectivity to support gene exchange between isolated populations if survey crews do not observe any desert tortoises in the area. Cecil said to use evidence of desert tortoises in wash areas as an indication that they are using those areas for dispersal or possibly as habitat.

Marit noted that the sampling areas in the proposals are within the modeled habitat area and include a buffer area. She asked if survey crews will miss some of the strata they should be sampling by limiting the survey to a buffer around the modeled area. Cecil said there could be up to three strata that they can sample; two within which one wouldn't expect to observe desert tortoises and maybe shouldn't give as much attention.

Rich asked if it is important to delineate different levels of habitat quality for the mitigation measures so that, for example, high quality habitat could have a larger mitigation ratio. Leslie said the mitigation measures haven't been determined yet. She said that areas outside of current COT limits that are in the Conservation Lands System (CLS) will be easier to protect at a higher standard because the COT's Mayor and Council passed a policy in October 2008 requiring all new annexations to comply with the CLS. If annexed, this land would still be protected with a 66.66%, 80%, or 95% set-aside. The land that is already in the COT limits is what is problematic because it is not covered by the CLS. The TAC might want to focus on these areas because they are slated for growth and they don't have CLS protection. Trevor said that that is a good point.

Jamie referred to a map that outlines what areas are inside and outside of current COT limits in the HCP planning area. Marit noted that the CLS only applies if there is a re-zoning. If not, then development only has to comply with the existing zoning. Leslie said that those areas are currently zoned for low density. Marit asked how the current zoning would affect the desert tortoise. Trevor said that the roads and infrastructure cause problems for tortoises. Cecil said this is true in the Tucson Mountains. Many tortoises are lost to road kill or captured as pets. Leslie said that if the landowners want to be annexed into the COT, then they will most likely go through a re-zoning process because one benefit of annexation would be to get a higher allowed development density than in Pima County. Land that is not annexed remains protected under Pima County's Multi Species Conservation Plan (MSCP); however, State Trust land is only covered by the CLS because it was excluded from the MSCP. Trevor said that they should

protect unique breeding populations and areas with the potential to host desert tortoises. Even though some of those areas will already be protected at 80% under the CLS, they can still require mitigation and get 100% protected areas.

Rich said that when desert tortoises are stressed, they retreat to certain survival areas and it could be really important to find these areas because the loss of them could have a negative impact on the species. He asked whether the best areas for survival could be detected through the proposed surveys. Trevor said no because the modeled habitat that they are testing is not comprised of those high quality survival areas. Cecil said they are finding that other species do retreat to micro-refugia when they are stressed and he agrees that desert tortoises probably do the same thing. Dennis asked if some of the refugia will be missed if the randomized sampling approach is used. Cecil said some will be missed, but others will be captured.

A representative from Company 1 was invited into the meeting room to speak about their proposal and answer questions. After a half hour, the same process was repeated for Company 2. After the question and answer period, the TAC and invited speakers evaluated the proposals further.

Cecil expressed concerns about Company 1's apparent lack of experience with the Sonoran desert tortoise. For example, he said that they were not aware of why April-May is not a good time to conduct a survey for the Sonoran desert tortoise. He said that Company 2's proposal is similar to what he would have written. Cecil said that he thinks phase one of the Company 2's proposal may be sufficient for what the TAC needs to validate the model. He said that he also didn't think phase two would be very costly because they would only be going back to the areas they determined were productive from phase one. Rich agreed that phase one will probably be adequate. He also commented that Company 2 addressed details of stratification while Company 1 did not.

Erin said that she is concerned that the TAC will not be able to get the information they need from Company 1's proposal. For example, Company 1 was proposing to only visit each site once. Erin said that she recommends a minimum of three visits per site because detectability for desert tortoises is very low. And, if one visits a site only twice, there is almost a 40% chance that one will miss a desert tortoise if it is there. Visiting the site three times reduces the chance of missing a tortoise to 20%. She said that at least Company 2 was proposing to visit each site more than once, which Erin believes is critical for tortoises.

Erin said that it isn't necessary to survey the entire site after a desert tortoise is observed because it does not contribute any additional information to the model. Each plot is assigned a zero or a one depending on whether a tortoise is detected, no matter how many are detected in that plot. Time and money will be saved if crews do not survey the entire site after a tortoise is detected. Erin said that stratification is important, but Company 2 might need to reduce the number of strata because it isn't beneficial to have as many sites as strata. With the number of sites in Company 2's proposal, two or three strata might make it more efficient. Erin said that to address the quality of habitat issue, the data collected could be incorporated with GIS habitat layers into models that determine what represents the best tortoise habitat. Then the map could be used to predict the probability of finding a desert tortoise in a given area.

Linwood asked Erin to clarify whether or not she was saying that if one observes a desert tortoise in a plot, then one doesn't finish the plot and one doesn't revisit it either. Erin said one shouldn't finish the plot on that particular visit, but it should be revisited because it is better for the analysis if all the plots are visited the same number of times.

Ries asked Erin if the absence/presence data collected could be used to determine density. Erin said that if survey crews keep a count of the number of sightings, then the density can be estimated, but she doesn't think there will be many sites with multiple desert tortoise sightings because of the terrain. Therefore, this may be difficult. She tried to estimate density from the information collected in her study but it was difficult because desert tortoises move in and out of sites.

Erin said that she visited each site five times during her study, which seemed like too many. Thus, she recommended four visits, though this may not be possible because of funding. Trevor asked if all of the visits needed to occur in the same season. Erin said yes; because of the mobility of the desert tortoises, they may move into another area from season to season. She added that there are different ways to survey the site to get more out of each visit. For example, she said that in her study, three to four people walked each transect, but in a wash it may be sufficient to have one person walk the transect. Ries said that if Company 2 visited each site three times, it would reduce the area to 40 hectares. He asked Erin if this is enough area to validate the model. Erin said they would probably want to cover more area, but if they agree not to finish a plot after a desert tortoise is detected, then they should be able to cover more ground. She said that even two visits is a big improvement from just one visit per site.

Leslie asked if desert tortoises have daily activity patterns that vary so that detection is more likely during certain times. Erin said yes and added that the most active times for desert tortoises are after dawn until mid-morning and two to three hours before sunset until sunset. Leslie asked if survey crews could add a site visit by leaving a site after a tortoise is detected and then returning at the end of the day for a second visit. Erin said that that is a good method and did not think that it would violate any rules for occupancy. Cecil agreed and said that he did this for a study involving frogs, adding that they just waited a certain amount of time before returning to the site. Erin said that one has to assume each visit is statistically independent. Variations can also be captured in the model, such as people who are better at detecting desert tortoises.

Trevor asked Cecil if the TAC should be concerned with how many escapees or drop-off desert tortoises may be in the HCP Planning Area. Cecil said that they didn't find direct evidence of that, but some genetic anomalies are probably due to transplants. Since the TAC, the COT, and the environmental consulting companies can't really do anything about it, it isn't really a concern that can be addressed as part of this study.

Jamie said that it sounded like the TAC would prefer to award the contract to Company 2. TAC members nodded in agreement. He asked the TAC to clarify conditions for the contract award. Rich said that the product needs to inform the model to the point that the model is a useful assessment of quality habitat in the uplands. Trevor recommended that the company take Erin's suggestions about ceasing the transect survey after detecting a tortoise as well as adding a third

transect visit. He also suggested that Company 2 staff meet with Cecil and Erin to discuss the stratification. Guy said that he thinks that three visits should be required even if the number of transects must be decreased. Erin said that there are trade-offs between the number of sites and the number of site visits. Detection may be higher in the area they are looking at than in the Arizona upland where she worked. However, Erin recommended that crews survey no fewer than 20 sites, and this is still low. She said that survey crews may be able to add sites if they are not going to complete each transect once a desert tortoise is detected.

Jamie asked Erin about the difference between the detectability of desert tortoise sign versus that of individuals. Erin said that scat is a very reliable indication that the site was used within the last year. However, she said that she is hesitant to include burrow signs or dens in the occupancy estimation method because it is difficult to determine if they are being used. Cecil agreed and said it would be sufficient to use scat for this purpose. Ries asked if it would be necessary for survey crews to remove detected scat so that it isn't re-counted during subsequent transect surveys. Erin said that she would recommend removing scat although she would like to review the literature to find out how sign is used for occupancy studies. If scat is removed, there is no way it can be detected again. Cecil said scat is used for occupancy surveys for other species. During her study, Erin said that her team did not include sign in the occupancy model. Instead, only live, desert tortoise individuals were surveyed. Rich suggested limiting the survey to 20 transects with three visits each, and only using desert tortoises instead of including sign. *[Action Item: Jamie will contact Company 2 about the desert tortoise work and relay the requests made by the TAC (e.g., to conduct three visits per site, not to continue a transect after a desert tortoise detection, etc.)]*

Leslie revisited an earlier discussion about focusing on areas inside COT limits. She said that it doesn't matter whether land outside the COT limits is modeled correctly. This is because it is going to be protected at 80% whether or not it is annexed since it has to comply with the CLS either way. She asked if the group should focus more on areas that are within the COT limits because this is where discrepancies in the model are more critical. Marit asked what the 80% set-aside would look like. Leslie said the COT will follow the same guidelines as Pima County. Trevor said that a biological site evaluation is done and the least sensitive areas of a site are the ones that are supposed to be developed. Marit asked what happens to the 80% set-aside. For example, is it public open space? Trevor said that has not been determined yet, but he and his affiliates are advocating for set-aside lands to be designated as Pima County open space.

Trevor said that the TAC is trying to validate the entire model, not just how the model is applied in the COT. Ries agreed. Leslie said that the study is needed to inform effective strategies in the HCP and focusing in the COT limits might benefit the HCP more. Trevor said it comes down to the stratification and how much is inside or outside COT limits. If most of the high quality habitat is within the COT limits, then it makes sense to focus there. Leslie said that Company 2 would probably reduce their number of strata to two, using riparian and upland. Riparian is probably lower quality, which is what dominates the areas within the COT limits, so there will be a predominance of low quality habitat in the COT limits. Trevor said that the TAC should ask Phil Rosen what he thinks are the benefits and drawbacks of looking at the whole area versus just in the COT limits. Jamie reminded the TAC that they previously decided to remove the eastern portion of the Southlands HCP planning area from the desert tortoise study because TAC

members said that they already determined that tortoises occur there. Marit said that it seemed like a more arbitrary delineation to focus just on the COT limits. Trevor said he thought that the entire HCP planning area was included in the policy that requires compliance with the CLS. Nicole said it only applies to new annexations. Jamie said he will confirm this. *[Action Item: Jamie will clarify whether or not the October 2008 COT Mayor and Council policy regarding the Conservation Lands System applies to the HCP planning area or just new annexations.]*

Guy asked if the output of the occupancy estimation method is the probability of occupancy. Erin said yes. Rich asked if the probability of occupancy could be determined for each area within a larger site. Erin said yes, an area can be divided into smaller areas that would each have a probability of occupancy. Guy said that this is why it is important for Company 2 to record the co-variants during their survey.

Dennis asked if all (i.e., age classes, sex, etc.) desert tortoises are measured the same using the occupancy method. Erin said that juveniles are usually excluded because detectability for small tortoises is much lower than adults (carapace lengths of 150 to 180 mm), so it changes the results. For this reason, she suggested only using adult desert tortoises in the survey. Marit asked if there are any ways to measure reproduction using this method. Cecil said it is very difficult because detectability is so low.

Rich asked Cecil if he thought the tortoise was going to be listed under the Endangered Species Act. Cecil said that he thinks it should not be listed until additional surveys are done. He said that one of the geographic areas in question may just have a detectability problem. In addition, Cecil said that he believes the declines are due to drought and said that he didn't think it made sense to list the species over something that they have no control over. Trevor commented that he is glad that the desert tortoise is a Covered Species in the COT's Greater Southlands HCP.

#### Ecological effectiveness monitoring for the Avra Valley HCP

Since Erin was present and could answer questions, Jamie wondered if occupancy could be used for ecological effectiveness monitoring. Erin said that abundance or density are usually used for monitoring. If one wants to use occupancy for monitoring, then the data collected indicate the proportion of an area that is occupied over time, not necessarily the density. The method looks at distribution, but if there is a decline in the population, data should show a decline in occupancy, although it might not be a one-to-one ratio. Rich asked how one determines the habitat attributes that are responsible for occupancy. Erin said that for each site visited, some measure of a vegetation community is collected and put into the model. Then, one can determine if desert tortoises are negatively or positively associated with that feature. This can be done with any number of variables. Cecil commented that he is a great fan of using occupancy models, but some history can be lost. Erin agreed and said that occupancy models are efficient, but there can be declines in abundance that are overlooked by the model.

In terms of future discussions regarding ecological effectiveness monitoring, Jamie said that the TAC needs to evaluate whether or not the items in the draft spreadsheet are practical and how this will inform the COT. They also need to identify where there are gaps that the group could use additional expertise to evaluate. Marit suggested that somebody from the group that wrote the buffelgrass strategic plan could speak about buffelgrass monitoring.

## **5. Upcoming meetings**

The following dates were selected for upcoming TAC meetings:

March 11, 2009, 1:00 to 4:00 p.m., U.S. Fish and Wildlife Service conference room

April 15, 2009, 1:00 to 4:00 p.m., U.S. Fish and Wildlife Service conference room

May 20, 2009, 1:00 to 4:00 p.m., U.S. Fish and Wildlife Service conference room

## **6. Call to the Audience**

No comments from audience members

## **7. Adjournment**

The meeting was adjourned at 4:00 p.m.

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### Summary of Action Items:

- Jamie will contact Company 2 about the desert tortoise work and relay the requests made by the TAC (e.g., to conduct three visits per site, not to continue a transect after a desert tortoise detection, etc.)
- Jamie will clarify whether or not the October 2008 COT Mayor and Council policy regarding the Conservation Lands System applies to the HCP planning area or just new annexations.